SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

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A "LIGHTNING FIGURE" PHOTOGRAPHED.

THAT the possession and care of a large library is a tax upon one's time and purse, nobody will deny, but on the whole it is a less evil than to be without the books you want, as I am at this moment uncomfortably convinced. How, I will presently explain.

At a meeting of the Meteorological Society, held March 24th, 1857, Prof. Poëy read a paper entitled "On the connection of photographic impressions with those of the images which lightning produces on the surface of the human body." A short abstract of the paper is printed in the Annual Report of the Meteorological Society for 1857, and from it I quote the first two cases of the seven there given.

1. The first authentic, but not the earliest, mention of this singular phenomenon, was made by Benjamin Franklin in 1786, who himself stated to a member of the French Academy, M. Leroy, that, twenty years previous, a man, who was standing opposite to a tree which had just been struck by lightning, was very much surprised to perceive on his breast a *fac-simile* of that *tree*.

A similar case was pointed out in the "Journal of Commerce" of New York, on the 26th of August, 1853, which gives the following account:—"A writer in the 'Intelligencer' communicates a curious incident. A little girl was standing at a window, before which was a young maple tree. After a brilliant flash of lightning, a *complete image of the tree* was found imprinted on her body. This is not the *first* instance of the kind."

The Report of the Society goes on to state:—

Shortly after the reading of M. Poëy's paper before the Society, the following communication was addressed to C. V. Walker, Esq., Member of the Council.

"On the Photographic Effects of Lightning," by James B. Shaw, Esq.

"I beg to give you the particulars connected with the photographic effects of lightning on six sheep, which were killed by a stroke of electricity about the year 1812.

"About four miles from the city of Bath, near the village of Coombe Hay, was at that time an extensive wood of hazel and detached oak-trees. In the centre of this wood was a field of about 50 yards square, in which were six

sheep, all of which were struck dead by lightning. When the skins were taken from the animals, a *fac-simile* of a portion of the surrounding scenery was visible on the inner surface of each skin. I do not remember whether these six beautiful photographic images were precisely similar, but I think they were.

"I remember that it caused great local sensation at the time, and the skins were exhibited in Bath, and I have no doubt there are many living now in that neighbourhood who could vouch for the correctness of this statement. I may add, that the small field and its surrounding wood were so familiar to me and my schoolfellows, that when the skins were shown to us, we at once identified the local scenery so wonderfully represented. I was much pleased to read the several cases mentioned before the Meteorological Society, proving the photographic effects of lightning on animals, as my statement of the circumstances herein described, frequently detailed by me, has always been received with credulity." [? incredulity—Ed.]

In 1861, Prof Poëy published an extremely fascinating memoir upon the subject.*

In the same year, and in 1862 Prof. Tomlinson, F.R.S., of King's College, published two papers in the *Edinburgh Philosophical Journal* on "Lightning Figures," in which he maintained that there was no photographic action whatever, but that the ramifications of the electric fluid, such as occur on deflagrating a sheet of gold leaf, had been erroneously identified with the branches of trees. I can deal only generally with this argument, because, on the completion of the Report of the Lightning Rod Conference, I forwarded Prof. Tomlinson's papers, and most of my pamphlets and books upon Lightning to the Society of Telegraph Engineers, thinking that I had done with the subject, and feeling, as I still feel, that copies of them ought to be in that splendid electrical library. Hence my opening complaint respecting the absence of books which I want.

A week or two since I was delighted to see the following letter in the *English Mechanic* :—

THUNDERSTORM AT DUNSE, BERWICKSHIRE, N.B.,
AND
SINGULAR PHENOMENON CONNECTED WITH IT.

On Saturday, the 9th of this month (June), about eleven o'clock a.m., a thunderstorm broke over the town, accompanied with a very heavy fall of rain. Four boys, each about 10 years of age, were overtaken by this storm about half a mile to the south-east of the town. Their nearest place for shelter was Cairnbank, and this place they reached, but not before each of them was thoroughly drenched with the rain. They entered the doorway of the stable, being the nearest house, but had scarce entered it when the lightning broke on a yew-tree at the back of the stable. Part of a wall near to the stable was also thrown down. The stable has a window at the back, and also another doorway at the end ; and when the yew-tree was struck one of the boys was thrown across the road, whilst the other

* Relation Historique et theorie des images Photo-Electriques de la Foudre. 2nd Ed. 12mo. Paris, 1861.

three were all thrown down. One of the residents at Cairnbank witnessed from her window the boy thrown across the road, and she, along with her husband, came to his rescue, when they also discovered the other three boys prostrate in the stable. They were carried into the house. One of the boys had got such a shock in his arms that he asked if they were off. His jacket was removed to see if there was any visible cause of the pain he seemed to suffer, when it was found that the impression of the yew-tree branches was as distinct on his arms and body as if there had been a prepared surface and struck off in the camera. Each of the boys presented more or less similar appearances. During the course of two days the appearances had all left their skin, and all the boys have fully recovered. A photograph was taken of the boy with the largest impression; and although not before it had begun to fade, still it is distinct enough to preserve a record of this wonderful phenomenon. Can any of your scientific readers offer an explanation?

We may state that on rehearsing the details to a friend, a day or two after it occurred, he gave it as a fact that sheep struck and killed during a thunderstorm, when the skin was removed, had the impression of the surrounding landscape distinctly left, which impression must have been struck through the outer skin.

The impression of the yew-tree branches which was so distinct had been struck through a cloth jacket and shirt as well, and this circumstance makes it the more wonderful.

Dunse, N.B. JOHN WILLIAMSON.

I immediately wrote to Mr. Williamson, and asked him to favour me by obtaining a copy of the photograph. He has not only done so but has also sent me a letter from Mr. Bruce who took the photograph, which, in spite of its length, I consider well worthy of reproduction.

LIGHTNING PRINTS ON BOYS.

To the Editor of the Berwickshire News.

"SIR,—It may be interesting to some of the readers of the *News* to know that, through the thoughtfulness of Mr. Gunn, chemist, I secured a well-defined impression of the 'lightning print' found on the arm of his son, George Gunn, who, along with other three boys, was, as reported in your last issue, struck by the electric fluid. So far as I am aware, it would seem that this is the first time this remarkable phenomenon has been photographed, and, perhaps, when the picture is put into the hands of one of our eminent electricians the photographic image may elucidate a point which is, at present, in the minds of many people rather hazy. In relating the miraculous escape those four boys made from a violent death, your correspondent, while suggesting the popular idea, that the delicately-traced figures, so very like fern fronds, or branches of trees, are caused by the object, which happens to be near the person struck by lightning, being printed on the surface of the body, does not identify himself with this theory. He only suggests the current idea, that the marks found on the necks and arms of the boys, may be representations of a tree not far distant from where they were standing. Now, while it is not to be wondered at that for generations this has been believed, I, for one, am not prepared to accept the

current belief as scientifically correct. The first objection which presents itself to my mind against the generally accepted opinion, that the floral figures impressed upon the skin are photographic representations of surrounding objects, is, that the photographic conditions necessary to form the image and retain it are entirely wanting, namely, a lens and a surface made sensitive to light. But, assuming that a law exists, unknown to us, by which the electric fluid in passing from a thunder-cloud to the earth so rarefies the air, that, as in the case of the mirage, the atmosphere, by the laws of reflection and refraction, depicts objects as clearly as a photographic lens; and further, that for the time being the surface of the human body is so affected as to become sensitive to light, and thus prepared to receive and retain impressions of surrounding scenery, the 'lightning prints' under these circumstances, would be, I think, different from what we find they really are. The floral figures which were so vividly represented on the bodies of the boys, were, what may be called, positive pictures, namely, a *dark* picture on a *white* ground; whereas, had they been formed by the chemical and optical laws that are essential to the formation of the photographic shadow of a tree, they would have been negative pictures—that is a *white* picture on a *dark* ground. There are other objections that might be mentioned, such as the position of the tree referred to by your correspondent in relation to the boys who were *within* the stable, and also, that while the 'lightning prints' were clearly defined, there were no impressions visible from the clothes they wore. I think, however, that sufficient has been said to show that we must search in some other direction for the cause of these mysterious and delicately beautiful forms, and, thanks to the researches and experiments of scientists, the probable explanation is not far to seek. by a simple experiment, a stream of sparks discharged from an electrical machine, can be broken up and made to take the exact form of figure found on the arm photographed. Or if a charged *Leyden jar* be substituted in our experiment, and a pane of glass be interposed between the knob of the vessel and the discharging tongs, a perfect *breath figure* of the discharge is seen on each side of the glass which bears a most striking resemblance to a tree. Knowing, then, that under certain conditions the sparks from an electric machine may be made to take the form of a brush, a feather, a fern, or a tree; we are, I venture to say, compelled to come to the conclusion that the markings developed on the necks and arms of our young friends were caused by the direct action of the electric fluid, paralyzing the nervous system, and causing, for a time, congestion in the capillary vessels, and therefore redness, wherever the tree-like sparks touched the skin.—I am, &c.,

GEORGE BRUCE.

Dunse, 15th June, 1883."

Those interested in the subject should send to Mr. Bruce, Dunse, Berwickshire, for a copy of the photograph, and I think that they will agree with me that the markings are not referable either to the yew tree or to photographic action, but simply to the well-known ramification of an electric discharge.

Whether my opinion be right or wrong is immaterial; the great fact is, that at last we have a beautiful photograph of the appearance which has been a bone of contention for half-a-century.

G. J. SYMONS.

EXTRAORDINARY HAIL-STORM AT BARTON, NORTH LINCOLNSHIRE.

ON Tuesday night, July 3rd, between 10 and 10.20 p.m., this town and immediate locality was visited by a storm of thunder, lightning, and hail of tropical severity. Never within the memory of the oft-quoted "oldest inhabitant" has such havoc been made by hail. Scarcely a pane of glass on the south-east aspect of any house in the town but is either smashed or cracked, and greenhouses and garden glass generally may be said to be utterly demolished. The size of the hailstones was enormous, and of every conceivable shape, weighing from ¼ ounce to 2 ounces, and some measuring 6 in. in circumference. Superintendent Ward picked up a piece of ice 2½ in. long, 2 in. wide, and 1 in. deep. In some cases the loss is estimated at hundreds of pounds. It was not only ordinary glass which was smashed, but thick heavy 3-16ths plate was unable to resist the impetuous rush of hail, and even the ¼ in. thick glass roof of the Drill Hall was broken. At Mr. Alexander Swanson's Mount Pleasant Nursery, over 2,000 ft. of conservatory and other glass was destroyed, and the fruit and flowers inside were much cut and injured. The hail-storm appears to have extended over a mile and a half in width, assuming a semi-circular form, commencing at Grimsby, along Pelham's Pillar, Wootton Grange (where the windows of Mr. Brooks' house were smashed, while no hail fell in the village itself); Burnham, Deepdale (where the Wesleyan Chapel windows were seriously damaged), to Barton, reaching The Grange on one hand, and Mr. Frank Bygott's farm on the other, so that Barrow and New Holland were exempt. It appears to have spent its force on the Lincolnshire side of the Humber, terminating at Barton Cliff, where the hail was comparatively small, while at the Marsh Farm no injury was done. In many of the fields of wheat and barley only an upstanding head is to be seen here and there, the straw being broken and the land strewed with heads; some of the fields of seeds which were waiting for the reaper look as though heavy rollers had passed over them. Mr. Stephenson, of The Beeches, was riding home, and had his hands severely bruised and his hat cut by the falling ice. The scenes of desolation next morning proved the intense severity of the storm. In the gardens and fields were many dead feathered songsters, and wild birds and ground game have been killed. As we before said, not a greenhouse or glass frame but is more or less smashed, and in some not a whole pane is left; grapes and flowers and cucumbers suffered very seriously, and the out-door fruit, such as pears, gooseberries, currants, and apples, lay on the ground by bushels, mixed up with broken branches and leaves. Many of the hailstones which fell at Barton were striated with opaque lines and had opaque cores, surrounded with a translucent covering, being frail but very beautiful objects. To give an idea of the quantity of ice which fell, it may be added that on the afternoon of the following day it lay in some of the field ditches 2 ft. deep.—Abridged from the *Hull and North Lincolnshire Times* of July 7th.

THE METEOROLOGICAL SOCIETY.

THE closing meeting of the present session was held on Wednesday evening, the 20th ult., at the Institution of Civil Engineers, Mr. J. K. Laughton, M.A., F.R.A.S., President, in the chair, when the following papers were read :—I, "On the Structure of the Ice-cloud

disposed in threads, proposed to be called Cirro-filum," by the Rev. W. Clement Ley, M.A. F.M.S. Of the Cirriform clouds one of the most important to the weather forecaster is that to which the author has given the name cirro-filum. Having from the time he was twelve years of age carefully studied this cloud whenever visible, and having for the last twenty-five years made it the subject of minute study, he is enabled to bring forward some results which may prove of value. The author gave, firstly, a short account of the mode in which he was led to prosecute this study; secondly, a classification of the more recent and reliable observations; and, lastly, an explanation of the principal phenomena observed. 2, "Notes on a Second Series of Experiments on the distribution of Pressure upon Flat surfaces perpendicularly exposed to the Wind," by Richard H. Curtis, F.M.S. The results obtained in these experiments agree very closely with those of the former experiments. 3, "On the Reduction of Wind Records," by the Hon. Ralph Abercromby, F.M.S. The author discussed the significance of, and the best method of deducing from anemographic records, the total quantity, the quantity from different points of the compass, the relative frequency, the mean hourly and annual velocity, the mean velocity from different quarters, the resultant, and the mean direction of the wind. 4, "The Spectroscope as an aid to Forecasting Weather," by F. W. Cory, M.R.C.S. F.M.S. 5, "Note on River temperatures as compared with Air temperatures at Greenwich and Bremen," by Robert H. Scott, M.A., F.R.S. The author compared the results given in a recent paper by Sir G. B. Airy on a comparison between the records of the temperature of the Thames and those of air temperature taken at Greenwich, with those published by Herr von Freeden for the temperature of the Weser, as compared with that of the air near Bremen, for the ten years 1858–67.

REVIEW.

Stanford's Compendium of Travel—North America. Edited by PROF. F. V. HAYDEN and PROF. A. R. C. SELWYN, F.R.S. 8vo. Stanford, xvi. 652 pages and 16 maps.

SOME years since we had the pleasure of noticing with warm approval the volume of this series which treated of Africa. The present is in all respects equal to it. Africa contained an entirely new idea in the formation of rain charts. North America contains a couple of maps which seems to us equally original. They are intended to show the areas of climatal extremes, and this they do as follows:—For extreme cold the data taken are (1) in the United States the mean temperature at 7.35 a.m. (Washington time) of the coldest week of 1872, and (2) for Canada the absolute minima during 1880.*

* It would, of course, have been better to have used identical data, both as to system and to epoch, but when the work was written synchronous data had not been published.

These values are indicated on the map by a series of tints running, in shades of blue for each 10°, from 60° down to zero, and then in three shades of black to —20°, beyond which the degrees are printed on the shading, for, as our readers are doubless aware —20° would quite fail to represent a Canadian minimum. The greatest cold is at a station in Lat. 56°, Lon. 119° W.; it is almost precisely in the same latitude as Edinburgh, and was evidently started by a Scotchman, for its name is Dunvegan, the same as our rainfall station in the West of Skye. But while the Scotch Dunvegan had a minimum of 16°·0, the Canadian Dunvegan had a minimum of —62°·4. Of the two stations Dunvegan in Skye is 95 miles nearer the North Pole than Dunvegan in Athabasca, and yet the minimum at the Canadian, is nearly 80° below that at the Scotch, station. It would probably be difficult to produce stronger evidence of the influence of the sea on the temperature of the West of Scotland.

This remarkable minimum has led us astray from the feature to which we desired to call attention. It is one of such importance that we scarcely think that its mention in a review is treating it with sufficient respect, but we cannot spare space for more elaborate notice.

The method of indicating pressure, temperature, rainfall, &c., by various colours laid upon maps, and by shaded maps, is now so common as to need no notice, but in the maps in this volume there is a most praiseworthy novelty. The following note appears in the corner of each map :—

"The tints cannot at present be extended over the Dominion of Canada, as the stations are so very few and far between."

This is perfectly true, and there is a tract in one part, without reckoning land more northerly than Edinburgh, where there are 450,000 square miles without a single station. We have on our table a very pretty looking map which runs its shaded tints all over this district, with what vividness of imagination, the facts we have just mentioned sufficiently prove. In Mr. Stanford's maps he has the pluck to recognise the absurdity of this proceeding. He inserts the notice we have just quoted, and puts small blocks of the appropriate tint over the sites for which he has data, thus giving one confidence in the districts which he has shaded, and pointing out those for which no information existed at the date of his maps. We add those last words because the Canadian system is being pushed steadily onwards, and every year sees some of the vast interstices filled up.

We have left ourselves no space for noticing Chapter VII., which treats of the climate and vegetation of British America, beyond saying that this long chapter (35 pages) contains the best general notice of Canadian climate which we have yet seen.

SOME COLONIAL RAINFALL NOTES.

RAINFALL IN 1882 AT WINDSOR FOREST PLANTATION, DEMERARA, BRITISH GUIANA.

Lat. 6°50′ N. Lon. 58°4′ W.

Rain gauge : Diameter of funnel, 5 in. ; height of top--above ground, 6ft. 6in. ; above sea level, 2½ ft.

1882. Month	Total Depth.	Greatest Fall in 24 Hours.		Number of days on which ·01 or more fell.
	inches.	Depth.	Date.	
January ...	8·62	2·24	9	23
February..	1·76	·54	21	7
March.....	6·87	1·86	14	11
April	11·20	4·21	3	12
May.....	18·39	2·50	29	23
June	13·08	2·23	2	22
July.....	8·46	1·49	26	18
August ...	5·69	1·34	7	14
September.	1·36	·60	10	5
October ...	5·24	3·65	7	6
November.	5·98	1·58	6	11
December .	10·90	1·63	10	23
Total ...	97·55			175

W. C. GRIFFITH.

[It seems almost as if there was a conspiracy to drive us from the resolution announced on page 76 of our last number, for within a month from its publication we have been favoured by the Rev. C. H. Griffith with copy of observations made by his son at a station on the opposite shore of the Demerara river to George Town, and about eight miles from that capital. We have seen no records from British Guiana since those made by Mr. Sandeman 1846–56, and published by the local government, and therefore the present records possess exceptional interest. We find that heavy falls in 24 hours are still the characteristic of the climate, for besides those quoted above, we find in Mr. W. C. Griffith's MS. falls in the previous year (1881) of 5·47 in. on May 1st ; 3·94 on May 19th ; 3·00 on November 27th ; and 6·47 in. on December 29th.

We have also been favoured by the Rev. S. Bridge with a copy of the daily record kept by his son at Ashcott, Hawke's Bay, New Zealand. As, however, there is for New Zealand a meteorological organization ably directed by Dr. Hector, F.R.S., it will be far better for Mr. Bridge to place himself in communication with Dr. Hector, if indeed he has not already done so. We notice that the Ashcott rainfall for 1882 was 47·63 in. ; our own Climatological Tables show that at Wellington it was 55·69 in., and at Auckland 45·44 in.—ED.]

EARTHQUAKES OF JUNE 25TH.

To the Editor of the Meteorological Magazine.

SIR,—You will perhaps be interested to know that yesterday there occurred a slight shock of what everyone believes to have been an earthquake.

I was on the point of rising from a chair after luncheon at 1.40 p.m., when there was a sound, *not like thunder*, but more like the rumble of a waggon on pavement under ground. The sideboard, a large one, shook, as also the wall and the pictures, and the floor of the room. The servants, at dinner, said that the earthenware on the table, and the table itself, shook, and also the kitchen stove. It was felt by people in almost every house in the neighbourhood for miles round, I am told, as far as from Budehaven to Okehampton, a distance of over 30 miles, and from Launceston to Holsworthy, 14 miles. In some places earthenware was shaken off the cupboards on which it was placed. As yet I hear of no injury of any kind. It was almost instantaneous, and followed by a clap of thunder about half an hour afterwards, but everyone is quite certain that the shaking of the walls, &c., was not occasioned by thunder. One man says he felt the earth on which he was standing out of doors shake, and a woman near this, in her garden, says she perceived the earth rise as it were.—Yours truly, WALTER WM. MELHUISH.

P.S.—In a shed, three miles distant, on the Bude Canal, where coals are kept for sale, the coals, which were piled up in a heap, fell.

Court Barn, near Holsworthy, Devon, 26th June, 1883.

To the Editor of the Meteorological Magazine.

SIR,—Two shocks were distinctly felt in this neighbourhood. I have fortunately been able to verify the exact time of the first shock, which may be assumed as 1h. 39m. p.m., correct within half-a-minute, at Kingsand, a village by the sea, one mile S.S.W. of Maker Church. I have not been able to verify the time of the second shock, but it was *after* 2.5.

So many accounts speak of a shock between 1.48 and 1.55 that I almost think there were three shocks in all. Very few persons felt *both* shocks here.

One invalid, lying in bed, who felt *both* shocks, describes the vibration of the *second* shock as much the more decided and continuous of the two.

A fisherman sitting on the ground thought that the earth was giving way beneath him, and sprang up in alarm at the second shock.

The usual rumbling sounds were heard, but were not particularly loud.

Unfortunately I heard and felt nothing myself, but the above statements are reliable.—Faithfully yours,

P. H. NEWNHAM.

Maker Vicarage, Devonport, June 27th, 1883.

[These are the only letters which we have received upon the subject. We add only two notes :—(1) As regards "True Time," we congratulate our correspondents upon their close agreement: one says 1.39 and the other 1.40; that looks as if observers were at last beginning to keep their clocks near the truth. (2) Mr. Newnham's letter greatly extends the area over which the shock was felt, and makes it more than 800 square miles.—ED.]

FICKLE JUNE.

To the Editor of the Meteorological Magazine.

SIR,—The following are the temperatures recorded here at 3 p.m. since this month set in, and the difference of each month from the preceding.

	Temp at 3 p.m. °	Difference. °
June 1	58	.....
,, 2	68	..... +10
,, 3	64	..... — 4
,, 4	61	..... — 3
,, 5	48	..... —13
,, 6	59	..... +11
,, 7	51	..... — 8
,, 8	58	..... + 7
,, 9	70	..... +12
,, 10	52	..... —18
,, 11	59	..... + 7
,, 12	61	..... + 2
Average difference ...	8°·6.	

FENWICK W. STOW.

Aysgarth Vicarage.

TRUE TIME.

AN ANTIQUE ERRATUM.

A CORRESPONDENT has called our attention to the example reprinted on p. 71 of our last number. We are glad to say that our reprint is accurate, but the worthy Mr. S. Watson, or his printer, A.D. 1694, got in rather a muddle. We give the figures as

Mr. Watson intended to give them :—

	h.	m.	s.
Original state of clock...	9	3	4
Correction for 8 nights		31	27
What the clock *should have been* on eighth night	8	31	37
What the clock *was* on eighth night* ...	8	34	32
Gain of clock		2	55

* Once printed 8 34 42, and once 8 24 32.

We may also here mention the publication of the fourth edition of "The Watch and Clockmaker's Handbook," by F. J. Britten (Kent & Co). It is crammed full of information respecting clocks and watches, and we are sorry not to have been able to give it a line of praise before, but want of space and want of time shut out many notices, and when a book reaches its fourth edition its utility may be regarded as proved.

To the Editor of the Meteorological Magazine.

SIR,—In the last number of the *Meteorological Magazine*, is a paper on "True Time." For many years past I have resorted to several simple means for the attainment of this. Should you meet with the published volumes of the *English Mechanic*, you will find some of these methods described by me. The volumes are XIV., March 15th, 1872, p. 664. (N.B.—By mistake of printer, it should have been stated that the wood-cut is $\frac{1}{3}$ of *real* size of apparatus). Vol. XV., April 19th, 1872, p. 121. Vol. XV., Sept. 6th, 1872, p. 640. That which I have called "the wall transit" might, probably, be rendered an effective instrument by a professional optician. That which I have used is only the rude work of my own hands. The transit "lines" are at once simple, and, within certain limits, accurate—My additions to their original forms as described by Dr. Derham, will be found in the paper in the *English Mechanic*. I now use the Dipleidoscope. This, however, is a somewhat expensive instrument, and requires accurate adjustment, which few, perhaps, will undertake. The "spot meridian dial," described I think in "Denison on Clocks," is easily constructed—and, I presume, will, when read with a lens, give the time to a few seconds. Perhaps some of the above may be of service to the readers of the *Meteorological Magazine*.—Yours truly,

N. J. HEINEKEN.

Sidmouth, June 18th, 1883.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JAN., 1883.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Maximum. Date.	Minimum. Temp.	Minimum. Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		
England, London	55·3	1	28·8	24	46·3	36·9	37·7	87	73·9	24·5	2·07	21	7·4
Cape of Good Hope	..	...	...	...	...	...	...	...	...	...	...	...	...
Mauritius	84·3	24	72·5	2	82·9	75·2	69·7	75	...	...	7·44	19	7·6
Calcutta	80·5	27	48·4	20†	76·2	53·0	53·8	71	144·8	35·2	·07	2	1·7
Madras	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay	87·1	17	62·0	29	83·5	69·0	63·8	65	140·6	53·4	·12	1	1·4
Ceylon (Colombo)	90·6	29	69·8	30	87·0	72·4	69·6	73	150·0	64·0	2·34	7	5·8
Melbourne	104·9	15	48·9	12	79·5	55·7	51·8	60	165·0	38·8	·42	5	4·5
Adelaide	109·5	15	49·2	2	88·3	61·4	48·6	40	171·5	40·6	·10	3	4·4
Wellington	80·3	27	48·0	30	72·6	56·7	...	...	148·0	46·0	2·02	3	...
Auckland	85·1	19	57·6	14	76·8	62·7	58·6	66	138·2	43·0	2·07	11	6·8
Falkland Isles	68 0	28	33·7	25	55·0	42·0	43·5	81	134·0	29·2	3·31	22	7·5
Jamaica (Kingston)	89·8	4	66·7	22	85·4	69·8	68·2	79	...	59·1	3·73	7	4·2
Barbados	80·0	var.	66·0	11	79·0	69·0	74·4	79	142·0	66·0	6·53	22	..
Toronto	40·5	30*	−7·8	23	25·1	9·4	16·2	84	108·0	−11·0	2·45	18	7·4
New Brunswick, S. John	40·0	21	−14·0	6	22·5	4·7	13·5	91	...	...	4·03	15	4·9
Cape Breton, Sydney	...	...	...	...	...	...	...	...	...	...	.	...	...
Manitoba, Winnipeg	14·7	12	−46·5	21	−5·4	−26·9	...	...	86·5	...	·64	12	4·8
British Columbia, Yale	46·5	9	−35·3	18	21·6	3·5	...	...	...	...	2·39	16	3·2

* And 31 † And 21.

REMARKS, JANUARY, 1883.

Mauritius.—Rainfall 1·45 in. above, and mean temp. 0°·2 below, the average; mean pressure, 29·921 in.; mean hourly velocity of wind 11·8 miles, extremes 29·2 miles, on 22nd, and 3·1 miles, on 21st, prevailing direction E. to N.E.; T and L on 21st, L on 26th and 31st. C. MELDRUM, F.R.S.

Ceylon.—TSS occurred on 26th and 27th.

Melbourne.—Mean pressure, and temp. of air, above the average, Mean temp. of dew point, amount of cloud, and humidity, all below the average; rainfall 1·23 in. below it. Prevailing direction of wind S. and S.W., strong breezes occurring on five days; hot wind on 15th; heavy dew on five days; L and distant T on 15th.

R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure slightly below the average of the previous 26 years; mean temp. nearly the same as the average; the max. reaching, or exceeding 90° on eleven days. On only two occasions have I registered a smaller rainfall during January.

C. TODD.

Wellington.—Very fine weather with variable winds up to the night of 10th, when R came on from N.W.; heavy R on 11th and 12th; from 12th to 28th splendid weather, though at times very warm with oppressive nights; remainder of month fine. Prevailing direction of wind N.W. R. B. GORE.

Auckland.—Bar. rather high; temp. also much above the average, wind mostly light; Weather principally very dry, but heavy R occurred on 24th, with N.E. wind.

E. B. DICKSON.

BARBADOS.—Mean temp. the same as the average; rainfall 38 per cent., and evaporation 41 per cent. above the average. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL, JUNE, 1883.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Rain.
		in.			in.
II.	Dorking, Abinger	1·61	XI.	Llanfrechfa Grange ...	1·92
,,	Margate, Birchington...	1·22	,,	Llandovery	5·72
,,	Littlehampton	1·45	,,	Solva	2·17
,,	St. Leonards	·87	,,	Castle Malgwyn	4·37
,,	Hailsham	1·15	,,	Rhayader, Nantgwillt..	4·50
,,	I. of W., St. Lawrence.	1·35	,,	Carno, Tybrith	4·21
,,	Alton, Ashdell.....	2·11	,,	Corwen, Rhug	3·18
III.	Winslow, Addington ...	2·48	,,	Port Madoc	3·43
,,	Oxford, Magdalen Col...	4·35	,,	I. of Man, Douglas	2·57
,,	Northampton	3·13	XII.	Carsphairn	2·32
,,	Cambridge, Beech Ho...	6·08	,,	Melrose, Abbey Gate ..	3·95
IV.	Southend	1·87	XIII.	N. Esk Res. [Penicuick]	2·65
,,	Harlow, Sheering	2·69	XIV.	Ayr, Cassillis House ...	3·14
,,	Diss	3·13	,,	Glasgow, Queen's Park.	2·54
,,	Swaffham	4·21	XV.	Islay, Gruinart School..	3·55
,,	Hindringham	4·25	XVI.	St.Andrews,NewtonBk	2·32
V.	Salisbury, Alderbury...	1·57	,,	Aberfeldy H.R.S.	1·67
,,	Warminster	2·48	,,	Dalnaspidal	3·16
,,	Calne, Compton Bassett	2·91	XVII.	Keith H.R.S.	1·71
,,	Beaminster Vicarage ..	4·26	XVIII.	Forres H.R.S.	·78
,,	Ashburton, Holne Vic .	4·47	,,	Strome Ferry H.R.S....	2·96
,,	Torrington, Langtree W	3·13	,,	Lochbroom	1·39
,,	Lynmouth, Glenthorne.	2·62	,,	Tain, Springfield.....	1·25
,,	Probus, Lamellyn	4·42	,,	Loch Shiel, Glenaladale	5·00
,,	Taunton, Fullands	1·73	XIX.	Lairg H.R.S.	...
VI.	Bristol, Clifton	3·11	,,	Forsinard H.R.S.	0·67
,,	Ross	4·30	,,	Watten H.R.S.	1·48
,,	Wem, Sansaw Hall.....	2·29	XX.	Fermoy, Glenville	2·00
,,	Cheadle, The Heath Ho.	3·91	,,	Tralee, Castlemorris ...	2·27
,,	Worcester, Diglis Lock	2·82	,,	Tipperary, Henry Street	1·40
,,	Coventry, Coundon	3·54	,,	Newcastle West	1·81
VII.	Melton, Coston	2·85	,,	Kilrush	...
,,	Ketton Hall [Stamford]	3·34	,,	Corofin	2·04
,,	Horncastle, Bucknall ...	4·06	XXI.	Carlow, Browne's Hill..	1·43
,,	Mansfield, St. John's St.	3·85	,,	Navan, Balrath	2·01
VIII.	Macclesfield, The Park.	4·36	,,	Athlone, Twyford	1·96
,,	Walton-on-the-Hill.....	2·38	XXII.	Mullingar, Belvedere ...	2·48
,,	Lancaster, South Road.	3·70	,,	Clifden, Kylemore	3·46
,,	Broughton-in-Furness ..	4·33	,,	Crossmolina, Enniscoe..	1·46
IX.	Wakefield, Stanley Vic.	3·54	,,	Carrick-on-Shannon ...	1·70
,,	Ripon, Mickley	3·34	XXIII.	Dowra	2·07
,,	Scarborough.....	2·67	,,	Rockcorry.....	2·30
,,	EastLayton[Darlington]	1·92	,,	Warrenpoint	1·77
,,	Middleton, Mickleton ..	2·42	,,	Newtownards	1·18
X.	Haltwhistle, Unthank..	3·10	,,	Belfast, New Barnsley .	1·93
,,	Shap, Copy Hill	4·27	,,	Bushmills	1·82
			,,	Buncrana	2·21

JUNE, 1883.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1870–9	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32° In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·35	— 1·32	·49	29	12	85·6	29	41·3	17	0	0
II.		Maidstone (Hunton Court)...	1·46	— ·61	·50	26	12	...	...	...	...	...	...
,,		Strathfield Turgiss	1·72	— ·38	·35	21	13	81·2	29	36·9	18	0	1
III.		Hitchin	2·08	— ·05	·52	15	12	77·0	29*a*	38·0	11	0	...
,,		Banbury	2·30	— ·14	·60	15	13	78·0	29*a*	37·0	17	0	...
IV.		Bury St. Edmunds (Culford)	2·08	— ·19	·76	15	12	87·0	29	37·0	11	0	..
,,		Norwich (Cossey)	2·73	+ ·51	·85	15	13	82·0	29*a*	39·0	1,9	0	0
V.		Bridport	3·05	...	·56	29	13	...	..	...	...	...	...
,,		Barnstaple.....	3·10	+ ·38	·49	24	16	77·0	4,5	48·0	24	0	..
,,		Bodmin	4·19	+ ·98	·86	27	19	74·0	4	42·0	23	0	0
VI.		Cirencester	4·82	+ 2·33	·91	27	15	..	...	...	...	...	...
,,		ChurchStretton(Woolstaston)	2·71	— ·16	·58	15	17	72·5	30	40·5	6, 17	0	...
,,		Tenbury (Orleton)	2·75	+ ·01	·51	20	19	76·3	29	39·3	2	0	...
VII.		Leicester	3·91	...	1·34	15	15	80·7	29	41·0	17	0	5
,,		Boston	4·18	+ 1·93	1·45	15	13	82·0	29*a*	42·0	18	0	...
,,		Grimsby (Killingholme).....	2·27	— ·10	·83	25	13	75·0	29	45·5	6	0	...
,,		Hesley Hall [Tickhill].....	3·28	...	·97	15	12	80·0	29	38·0	7	0	...
VIII.		Manchester (Ardwick).....	3·78	+ ·62	1·54	26	16	78·0	30	47·0	6	0	...
IX.		Wetherby (Ribston Hall) ...	2·94	+ ·07	·95	30	10	...	...	...	...	...	...
,,		Skipton (Arncliffe)	4·30	+ ·48	1·30	25	17	75·0	13*a*	35·0	17	0	...
X.		North Shields	2·33	+ ·30	1·03	25	17	75·5	29	38·0	8	0	...
,,		Borrowdale (Seathwaite).....	8·09	+ ·28	1·99	26	14	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	3·31	+ ·25	1·21	27	18	...	...	...	...	...	...
,,		Haverfordwest	4·15	+ 1·12	1·27	27	15	77·0	5	41·0	7	0	...
,,		Plinlimmon (Cwmsymlog) ...	4·83	...	·70	15	19	...	...	...	...	...	...
,,		Llandudno.....	1·70	— ·30	·36	19*c*	11	70·4	29	44·8	6	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	2·85	— ·32	·88	25	15	71·0	9	38·8	18	0	...
,,		Hawick	3·64	+ 1·13	1·85	25	14	...	...	..	...	...	...
XIV.		Douglas Castle (Newmains)	2·45	— ·56	·90	25	13	...	...	...	...	...	...
XV.		Lochgilphead (Kilmory).....	4·39	+ ·55	1·73	26	14	...	...	...	...	...	...
,,		Appin (Airds)	2·92	...	...	...	...	...	...	...	...	...	.
,,		Mull (Quinish).....	3·83	...	·98	29	18	...	...	...	..	...	...
XVI.		Loch Leven Sluices	2·60	— ·17	1·10	26	8	...	...	...	...	...	...
,,		Arbroath	2·08	— ·53	1·14	25	12	72·0	12	40·0	8,18	0	...
XVII.		Braemar	2·63	— ·46	·34	25	16	70·0	30	34·0	8	0	7
,,		Aberdeen	1·16	...	·47	25	12	...	...	...	...	...	...
XVIII		Skye (Sligachan)	...	...	...	...	...	...	...	...	...	...	...
,,		Culloden	·89	— 1·36	...	..	...	71·0	30	35·2	21	0	7
XIX.		Dunrobin	1·66	...	·42	24	12	68·5	30	39·5	21	0	...
,,		Orkney (Sandwick)..... ..	...	...	...	...	...	...	...	..	...	...	...
XX.	IRELAND.	Cork (Blackrock)	2·38	— 1·17	·46	27	16	62·0	12	43·0	26	0	...
,,		Dromore Castle	3·13	...	·80	28	18	73·0	4	...	...	...	...
,,		Waterford (Brook Lodge) ...	2·40	...	·52	9	16	73·0	5	41·0	17	0	...
,,		Killaloe	2·56	...	·49	29	18	80·0	...	40·0	27	0	...
XXI.		Portarlington	1·83	— ·60	·26	17	20	72·0	3	42·5	15	0	...
,,		Dublin (FitzWilliam Square)	1·93	— ·27	·28	17	18	70·1	30	44·4	16	0	0
XXII.		Ballinasloe	2·98	— ·21	·82	29	18	68·0	8	41·0	16*b*	0	...
XXIII.		Waringstown	1·33	— 1·33	·28	19	13	85·0	24	36·0	2	0	1
,,		Londonderry (Creggan Res.).	2·21	...	·29	24	19	...	...	...	...	...	...
,,		Omagh (Edenfel)	2·56	— ·49	·47	25	21	70·0	30	38·0	2	0	...

+ Shows that the fall was above the average ; — that it was below it.

a And 30. *b* And 17, 20, 21. *c* And 24.

METEOROLOGICAL NOTES ON JUNE.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain H for Hail S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—Weather at first fine, but during the last week very unsettled, heavy storms of R interrupting haymaking, but greatly benefiting all crops, especially the roots. Altogether the prospects are more favourable than for some years past, although the season is late. Hay cut on 4th. TS on 10th.

BANBURY.—TSS on 10th, 26th, and 29th; T and L on 8th, and T on 21st.

CULFORD.—Early part of the month very dry, with hot days and cold nights; vegetation suffered from the drying east winds. On the 13th, and to the close of the month, gentle and refreshing R fell. Tempest on 24th; T on the 13th, 16th, 26th, and 30th.

COSSEY.—The rainfall in the county varied very much; at Fakenham, I believe, over 3·30 inches fell between 13th and 16th inclusive.

BODMIN.—Magnificent weather up the 14th, after which R fell on nearly every day. Mean temp. 61°·3.

CIRENCESTER.—A favourable month for the crops (the land having been rather dry previously), but not very favourable for haymaking.

ORLETON—The first 14 days fine and dry, with much sunshine, except from the 7th to 10th, when there were clouds and showers every day and frequent very distant T. The remainder of the month was generally cloudy, with R on every day but two, and a low temp. till the 23rd. Mean temp. of the month rather more than 1° below the average of 20 years; T heard on 7 days; L seen on 3 days. The weather was very favourable for vegetation and for all farming operations.

LEICESTER.—The month has been a changeable one, sometimes very hot, and then somewhat cold, with much T and L, sometimes very heavy. The outlook for harvest upon the whole is good, though dry and settled weather would be acceptable; potatoes a very good crop, fruit of most kinds is abundant.

BOSTON.—A great deal of T and L at the end of the month, accompanied by heavy R; on 26th a very severe hailstorm passed over Boston, doing a great deal of damage to the gardens and fields, cutting the beans down to the ground, leaving the gardens bare of every flower, and the gooseberries and currants lying on the ground. The wheat came in ear about the 27th.

KILLINGHOLME.—On the whole a very fine month. T heard on several days, but no TS except on 29th, and that not severe. Beginning of month very dry; very fine rains afterwards; crops full of promise.

HESLEY HALL.—During the first three weeks weather cool, but with plenty of sunshine; during the last week somewhat sultry, with hot sun, R and TSS.

MANCHESTER (ARDWICK).—On the whole a fine month, though a want of R during the early part caused serious inconvenience, there being a scarcity of water in some parts of Lancashire, but the R which began about the middle, has wonderfully improved the crops; the closing part of the month was deficient in bright sunshine. Temp. moderate with a few warm days and some cold nights. TSS on the 8th and 25th.

ARNCLIFFE.—TS and heavy R on 25th.

WALES.

HAVERFORDWEST.—The fine warm weather of the last month and the early indications of great heat have been gradually dissipated; after the 17th the weather has daily become more and more precarious; few days attain to anything like summer heat; wind constantly S. Haymaking prospects are gloomy, although the early heat, followed by so much R, has caused everything to grow luxuriously. The potato crop appears likely to be light. Temp. on the whole moderate and rather below the average.

LLANDUDNO.—Rainfall and temp. below the average; the month began and ended fine and warm, but from the 7th to the 22nd inclusive, the temp. was considerably below the average. Nearly the whole of the rainfall occurred from the 14th to 27th. In consequence of the dryness at the end of May and the beginning of this month, the pastures failed and the hay crops are much under the average. There were 182 hours of bright sunshine.

SCOTLAND.

CARGEN.—Rather a dull month with want of sunshine, vegetation has, however, made good and satisfactory progress. Mean temp. 2°·8 below the average. T on 9th and 25th.

HAWICK.—A fine genial month, the blossom on all trees and shrubs being most abundant; very severe TS on 25th.

KILMORY.—Dry at the beginning of the month, but with very cold winds, which retarded vegetation. Severe TSS on 26th, accompanied by high wind which blew down a great many branches of trees, and knocked about many of our herbaceous plants; the R fell in torrents for over 6 hours, during which time 1·60 in. was registered, causing many of the small streams to overflow.

BRAEMAR.—A fine genial month; foliage luxuriant.

CULLODEN.—Very dry month, especially the first half; pasture and cereals on light lands suffering.

IRELAND.

DROMORE.—A favourable month for all crops, which were backward on account of the low temp. of May.

WATERFORD.—The early part of the month was warm and dry; the latter half very unsettled, S.W. wind prevailing during the last 10 days; T on 9th and 26th.

DUBLIN, FITZWILLIAM SQUARE.—The earlier portion of the month was fine and often bright; after the 13th the weather was cloudy, showery, and generally changeable and cool; the last three days were warm. Mean pressure identical with that of May, mean temp. 1° below the average, rainfall slightly under, and number of rainy days four in excess, of the average. TS occurred on the 19th, T was also heard on the 8th, H fell on the 15th, solar halo seen on 13th.

BALLINASLOE.—Weather very changeable, being warm at the beginning and end of the month. Strong and cold east winds prevailed from the 7th to 26th, doing much injury to vegetation; very heavy T showers occurred on the last few days of the month. T and L on the 10th and 29th.

WARINGSTOWN.—A splendid month, warm and genial, rainfall a little below requirements, but vegetation on the whole most luxuriant.

EDENFEL.—First week fine and dry, remainder of month dull and cloudy, with more or less R on almost every day; all crops (except force-grass hay) luxuriant.